



**TUFTS UPDATE – NOVEMBER 8, 2019**  
**PREPARED BY LEWIS-BURKE ASSOCIATES LLC**

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## **Introduction**

This edition of the Tufts Washington Update for early November for funding opportunities and agency updates. Faculty, staff, and researchers are welcome to schedule calls with the Lewis-Burke Tufts team or meet with the team when they visit Washington, DC. Contact Amanda Bruno, Lewis-Burke Associates LLC, at [amanda@lewis-burke.com](mailto:amanda@lewis-burke.com) with any questions or comments related to the Update's content, for more information on updates and opportunities, or to add a new recipient to the distribution list.

## **Funding Opportunities**

### **NSF Releases New Microbiome Solicitation Under Rules of Life Big Idea**

The National Science Foundation (NSF) has released a new solicitation as part of the Understanding the Rules of Life (URoL) Big Idea, entitled Understanding the Rules of Life: Microbiome Theory and Mechanisms (URoL:MTM). In this cross-directorate effort, NSF plans to invest between **\$12 million and \$15 million** to better understand the theoretical and mechanistic relationships within and among the microbiome, the host, and the environment. In particular, the program is interested in the development of “novel experimental methods and theory, comparative approaches integrating knowledge from different scientific disciplines, predictive modeling, new mathematical, computational and data science approaches, and integrated multi-disciplinary education and outreach activities.”

Proposals must include both the use of the interdisciplinary activities that “integrate perspectives and approaches from more than one research discipline” and a plan to address “reproducibility and replicability of sample collection and preparation, experimental design, data analysis, model generation, and/or validation of computational methods.” Proposals are strongly encouraged to “i) identify causal relationships within members of the microbiome, and among the microbiome, host (if any), and the environment; ii) investigate how these relationships affect the robustness and adaptability of organisms and communities; and iii) determine how these interactions affect the observable characteristics of the environment and vice versa.” Additionally, proposals could respond to, but are not restricted to the following topics around the microbiome:

- “The use of engineering, computational, statistical, biological, physical, and chemical approaches, including models and mechanistic studies to understand molecular communication within the microbiome, and between microorganisms and the host and/or environment;
- New combinations of computational approaches, including life-, physical-, and social-science methods to understand scale-invariant principles as well as temporal and spatial variation in microbiome structure and function across different levels of analysis;
- Leveraging computational approaches and different types of datasets from a wide range of organisms, from microbes to humans, in diverse physical and social environments to understand the evolution of microorganisms in microbiomes and the co-evolution of microorganisms, environment, and host;
- The use of predictive ecological and evolutionary principles along with engineering, computational and statistical science to understand, predict, and engineer microbiome assembly;
- The use of data science and control theory approaches to understand the existence of functional redundancy and the role it may play in microbiome diversity and resiliency to changing environmental conditions;
- New computational, engineering, biological, physical-chemical and/or social networking approaches to understand and predict how a host's genetic composition, physiology, and behavior influence the genetics, physiology, and behavior of the microbiome and vice versa;
- Cross-disciplinary approaches to understand the relationship between the microbiome and brain function in humans and other species;
- New models and cross-disciplinary approaches to understand, predict, and control how horizontal gene transfer affects the function and co-evolution of microbiome and host (and/or environment).”

Projects are also encouraged to leverage artificial intelligence approaches and integrate workforce development, undergraduate and graduate research experiences, as well as experiential learning opportunities for K-12 students.

Researchers should not submit proposals supported by the core programs of NSF's Directorates or within the purview of the Department of Agriculture, Department of Energy, or the Department of Health and Human Services. Although proposals must be submitted to the BIO Division of Emerging Frontiers, a cross-foundational team of program officers will oversee the program. The solicitation limits individuals to serve as PI or Co-PI on only one proposal, although there is no limit on proposals per institution.

**Due Date:** Letters of intent, required for both tracks, are due by **January 17, 2020**. Full proposals are due by **March 2, 2020**.

**Eligibility:** Eligible applicants under this opportunity include institutes of higher education, non-profits, and research labs. There is no limit on the number of proposals per organization; however, individuals may only be designated as PI or Co-PI, on one proposal.

**Total Funding and Award Size:** NSF anticipates between \$12 million and \$15 million in available funding to support six to 12 new awards. There are two submission tracks: Track 1 provides up to \$500,000 over three years and Track 2 provides up to \$3 million over five years. NOTE: Track 2 proposals are required to submit management plans as a part of their supplementary documentation.

*Sources and additional information:*

- The full solicitation is available at <https://www.nsf.gov/pubs/2020/nsf20513/nsf20513.pdf>.
- The program page for URoL:MTM is available at [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505694](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505694).
- More information on the Rules of Life Big Idea is available at [https://www.nsf.gov/news/special\\_reports/big\\_ideas/life.jsp](https://www.nsf.gov/news/special_reports/big_ideas/life.jsp).

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### **NSF Releases Engineering Solicitation for Addressing Systems Challenges through Engineering Teams**

On November 4, the National Science Foundation (NSF) announced a new program within the Engineering Directorate (ENG), Division of Electrical, Communications and Cyber Systems (ECCS) titled, "Addressing Systems Challenges through Engineering Teams (ASCENT)." ECCS envisions that the new ASCENT program will support a connected portfolio of projects across the three ECCS clusters: Communications, Circuits, and Sensing-Systems (CCSS); Electronics, Photonics and Magnetic Devices (EPMD); and Energy, Power, Control, and Networks (EPCN).

ASCENT will support research to address complex challenges that cannot be done by a single investigator. According to the program page:

- "ASCENT supports fundamental research projects involving at least three collaborating PIs and co-PIs, up to four years in duration, with a total budget between \$1 million and \$1.5 million.
- ASCENT proposals must highlight the engineering leadership focus of the proposal within the scope of ECCS programs.
- ASCENT proposals must articulate a fundamental research problem with compelling intellectual challenge and significant societal impact. The topic at the heart of the proposal must lie within

the scope of at least one of the three ECCS clusters (CCSS, EPMD, EPCN). Research proposals spanning multiple clusters are highly encouraged.

- ASCENT proposals must demonstrate the need for a concerted research effort by an integrated and interdisciplinary team, and strongly justify the interdisciplinary nature of the proposed work. They should include a timeline for research activities, with a strong justification of the explicit mechanisms for frequent communication between team members and effective assessment to achieve proposed goals.”

NSF plans to make between four and six awards through this solicitation. **Letters of Intent are due January 7, 2020, and full proposals are due February 19, 2020.**

In terms of scale and scope, the ECCS ASCENT program resembles the “Leading Engineering for America's Prosperity, Health, and Infrastructure (LEAP HI)” program that was introduced by ENG’s Division of Civil, Mechanical and Manufacturing Innovation (CMMI) in 2017.

*Sources and Additional Information:*

- Additional information on the ASCENT program is available at [https://nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505732](https://nsf.gov/funding/pgm_summ.jsp?pims_id=505732).
- Additional information on the LEAP HI program, including information on previously awarded projects, is available at [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505475](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505475).

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### **NSF Releases Solicitation for Biology Integration Institutes**

On October 28, the National Science Foundation’s (NSF) Directorate for Biological Sciences (BIO) released the long-awaited solicitation for its Biology Integration institutes (BII) as part of its aim to facilitate a “unification of biology.” BII will support research collaborations across disciplines, both within and beyond biology, that address an overarching biological theme and will fund awards of up to \$12.5 million over five years.

This announcement follows a 2018 Dear Colleague Letter requesting input from the community on potential research topics and fundamental biological questions that could instigate transformative, cross-cutting research supported through integration institutes. BII is also the first funding announcement linked to the broader “Reintegrating Biology” initiative launched earlier this year with the goal of integrating biological disciplines to address larger more complex biological research questions that fall beyond the scope of BIO’s core programs.

Proposed institutes should identify a theme to guide their proposal based on a “compelling biological question poised for breakthroughs by collaboration across biological disciplines.” While the goal of the program is to integrate the biological disciplines, any scientific field may be included to address the theme of the proposal. Proposals should also include innovative integrated education and training components that help prepare the next generation of biology researchers that can work across disciplines. Where appropriate, the solicitation recommends proposals leverage existing or prior NSF investments in biological research infrastructure, cyberinfrastructure, or training. Proposals will also be evaluated on the quality of their outreach activities, their plans to broaden participation at all team levels, and their plans to disseminate results to the broader biological community.

The solicitation outlines two distinct tracks for the program, **Design** and **Implementation**. The Design track, similar to a planning grant and funded at \$200,000 for up to two years, will support “workshops, development of partnerships, exploratory analyses, engagement of stakeholders” in an effort to foster “groundbreaking” ideas for future Implementation proposals. The Implementation track will fund cooperative agreements of up to \$12.5 million over five years with the opportunity for a five-year extension.

**Total Funding and Award Size:** Up to \$15 million is available for 4-16 awards: up to 10 Design awards of up to \$200,000 for up to two years; and 4 to 6 Implementation awards of up to \$12.5 million for a five-year commitment to a cooperative agreement and a possible five-year continuation.

**Due Dates:** Letters of intent, which are required for Implementation proposals, are due **December 20, 2019** by 5:00 PM submitter’s local time. Full proposals for both tracks are due by **February 6, 2020**.

**Eligibility:** Eligible applicants under this opportunity include institutes of higher education, non-profits, and research labs. There is no limit on the number of proposals per organization; however, individuals may only be designated as PI or Co-PI, on one proposal including Design and Implementation tracks. Additionally, proposals that involve multiple organizations must identify a lead organization and a single proposal describing the entire project must be submitted by that organization with a budget form submitted for each subawardee.

*Sources and Additional Information:*

- The full BII solicitation can be found at <https://www.nsf.gov/pubs/2020/nsf20508/nsf20508.pdf>.
- The BII program page can be found at [https://www.nsf.gov/funding/pgm\\_summ.jsp?pims\\_id=505684&org=NSF](https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505684&org=NSF).
- The December 2018 DCL on the integration institutes is available at <https://www.nsf.gov/pubs/2019/nsf19027/nsf19027.jsp>.
- Additional information on the Reintegrating Biology initiative is available at <https://reintegratingbiology.org/>.
- The list of questions generated by the Reintegrating Biology Townhalls can be found at <https://reintegratingbiology.org/wp-content/uploads/2019/10/Reintegrating-Biology-Town-Hall-1-and-2-Aggregated-Questions.xlsx>.

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**DOD Releases SERDP BAA for Environmental Research and Development**

The Department of Defense (DOD) recently released its fiscal year (FY) 2021 broad agency announcement (BAA) for its Strategic Environmental Research and Development Program (SERDP). SERDP works with the Department of Energy and Environmental Protection Agency to fund science and technology research to address environmental issues related to DOD. Proposals should aim to advance the environmental performance of DOD by “improving outcomes, managing environmental risks, and/or reducing costs or time required to resolve environmental problems.” Proposals should specifically respond to SERDP’s statements of need. For FY 2021, the statements of need focus on environmental restoration, munitions response, resource conservation and resilience, and weapons systems and platforms.

Pre-proposals are required and due on **January 7, 2020 at 2:00 p.m. ET**. Full proposals, if invited, are due on **March 5, 2020 at 2:00 p.m. ET**. DOD anticipates making multiple awards totaling \$12 million, and awards are anticipated to begin in June 2021.

*Sources and Additional Information:*

- More information on SERDP and its statements of need for FY 2021 can be found on its website [here](#).
- The full pre-solicitation can be found on [www.fbo.gov](http://www.fbo.gov) under solicitation number "W912HQ20S0004."

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**EPA Releases STAR Solicitation for Research on Harmful Algal Blooms**

The U.S. Environmental Protection Agency (EPA) has issued a \$6 million request for applications (RFA) as part of its Science to Achieve Results (STAR) grants program. STAR is EPA's primary mechanism for funding extramural research. This particular solicitation is focused on addressing harmful algal blooms (HABs) by supporting research aimed at better understanding and addressing HAB nutrient loadings. EPA is especially interested in proposals for evaluating existing HAB mitigation methods, scaling up emerging nutrient treatment technologies, and developing best practices for addressing HABs in both urban and rural communities.

The three research topics outlined above closely align with report language included in the fiscal year 2019 Interior and Environment Appropriations bill, and thus represent a congressional priority. In addition, the solicitation is explicitly geared towards certain geographic areas. As stated in the RFA, proposals "are encouraged to address excess nutrient loading relevant to issues faced by areas of the Great Lakes, Florida, and the Midwest that have been or are currently experiencing HABs."

**Award Size:** EPA intends on providing \$6 million for a total of six awards, each funded at no more than \$1 million over a performance period of three years.

**Eligibility:** This solicitation is open to institutions of higher education and non-profit organizations, including hospitals.

**Important Deadlines:**

- Applications are due **December 10, 2019**.

*Sources and Additional Information:*

- The full RFA is available at <https://www.epa.gov/research-grants/approaches-reduce-nutrient-loadings-harmful-algal-blooms-management>.
- Registration instructions for the informational webinar are available at <https://www.epa.gov/research-grants/informational-webinar-approaches-reduce-nutrient-loadings-harmful-algal-blooms-habs>.

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## **DOE Highlights Future Biological and Environmental Research and Funding Opportunities**

Please see below for an update and advance intelligence on recent activities, emerging priorities, and future opportunities within the Department of Energy (DOE) Biological and Environmental Research (BER) program. This analysis is based on information from the BER Advisory Committee (BERAC) meeting on October 24-25, 2019, discussions with program managers, and the release of new reports in genomics and watershed research networks.

### **Strategic Priorities**

The DOE Office of Science Director, Dr. Chris Fall, attended his first BERAC meeting and wanted to assure BERAC members that he has no plans to change the Office of Science research priorities, which include the exascale computing initiative, quantum information science, artificial intelligence and scientific machine learning, and engineering biology and biosecurity. BER has funding allocated to all four of these priority areas.

Table 1. FY 2020 Office of Science Priority Research Initiatives

<b>Research Initiative</b>	<b>ASCR</b>	<b>BES</b>	<b>BER</b>	<b>FES</b>	<b>HEP</b>	<b>NP</b>	<b>Total</b>
Machine Learning / Artificial Intelligence	36,000	10,000	3,000	7,000	15,000		<b>71,000</b>
Biosecurity			20,000				<b>20,000</b>
Quantum Information Science	51,161	52,503	12,000	7,520	38,308	7,000	<b>168,492</b>
Exascale Computing	463,735	26,000	10,000				<b>499,735</b>
Microelectronics		25,000					<b>25,000</b>
Isotope Development and Production for Research and Applications						47,500	<b>47,500</b>
U.S. Fusion Program Acceleration				4,000			<b>4,000</b>
<b>Total</b>	<b>550,896</b>	<b>113,503</b>	<b>45,000</b>	<b>18,520</b>	<b>53,308</b>	<b>54,500</b>	<b>835,727</b>

Source: DOE Office of Science.

Dr. Fall also highlighted three research and development Administration priorities for fiscal year (FY) 2021 laid out in the August 2019 White House memo on federal research priorities of most relevance to the BER program—earth system predictability, the bioeconomy, and artificial intelligence. The FY 2021 memo is the first-time earth system predictability and the bioeconomy have been specifically identified as government-wide research and development priorities.

In addition to advancing these research priorities, Dr. Fall's focus will be on (1) strengthening partnerships with other federal agencies, such as NIH and more broadly with the Department of Health and Human Services, to launch new Moonshot Initiatives like the Genome Science Initiative, to accelerate drug discovery and improve healthcare delivery; (2) delivering world-class construction projects of major user facilities on time and on budget to maintain the Office of Science's reputation in project management; and (3) reversing deferred maintenance and tackling aging infrastructure, such as utilities and other support systems, at the DOE Office of Science national laboratories.

### **Budget and Appropriations Update**

DOE, like all other federal agencies, is under a Continuing Resolution until November 21. The BER program will continue to execute at the FY 2019 funding level of \$705 million, which includes \$368 million for Biological Systems Science and \$337 million for Earth and Environmental Systems Sciences, until there is resolution on FY 2020 congressional appropriations. The House and Senate FY 2020 appropriations bills both recommended significant increases to BER.

	FY 2019 Enacted	FY 2020 House	FY 2020 Senate	Senate vs. FY 2019 Enacted	Senate vs. House
Biological and Environmental Research	705,000	730,000	770,000	65,000 (9.2%)	40,000 (5.5%)

**Once FY 2020 congressional appropriations are complete, BER plans to move aggressively in issuing funding solicitations.**

### Biological Systems Science

#### *Funding Opportunities*

BER plans to release four FY 2020 funding opportunity announcements, as early as November 2019, with funding awards made by July 1, 2020, subject to congressional appropriations and the availability of funds. In FY 2019, the overall funding success rate of submitted proposals to BER's funding opportunity announcements was 15 percent and will likely be the same in FY 2020. NOTE: The first two funding opportunity announcements will be open to research universities while the remaining two will be Lab-only calls with the opportunity for university research collaborations.

- Systems Biology Research to Advance Sustainable Bioenergy Crop Development: DOE plans to issue a \$15 million solicitation that would fund between five and 15 awards ranging from \$1 million to \$3 million per year over five years. The focus would be on systems-level research to better understand the molecular and physiological mechanisms that control bioenergy crop vigor, resource use efficiency, and resilience/adaptability to environmental stress and systems biology-enabled investigations into the roles of microbes and microbial communities in the complex and multi-scaled interactions of the plant-soil-environment. The last funding call in this topic area was in 2014.
- Computational Tool Development for Integrative Systems Biology Data Analysis: This would be the first open solicitation on this topic. The goal would be to create robust computational frameworks for data integration, analysis, and sharing that can accommodate the wide variety of heterogeneous data streams being generated across the Genomic Science community. The priority areas will likely be integration and analysis of omics data (as well as meta-omics variations), nonomics-based analytical technologies for quantitative physiological analysis, physicochemical measurements of environmental factors, and a vast array of other experimental data types. BER has found that incorporating detailed molecular, biochemical, physiological, and structural information into biological models and simulations remains a major challenge. Four DOE national labs—Oak Ridge, PNNL, Berkeley, and Brookhaven—are currently being funded by BER to do preliminary work and their perspectives would be valuable for research universities interested in pursuing this area of research.
- New Quantum Enabled Bioimaging Approaches for Bioenergy: DOE plans to issue a \$12 million Lab-only funding call with an opportunity for research university collaborators. This would be BER's first funding opportunity announcement in quantum information science and the last of the six Office of Science major program offices to fund quantum research. The focus is exclusively on bioimaging techniques and BER is open to innovative proposals.
- Secure Biosystems Design: DOE plans to issue a \$20 million Lab-only funding call. BER is already funding and plans to further expand four pilot projects at Argonne, Oak Ridge, PNNL, and SLAC. The purpose is to develop design tools to introduce synthetic genomes or Megabase-size gene constructs into microbes and plants to understand secure controls for microbe-plant

interactions in the environment. The goal is to prevent unauthorized or accidental release of modified organisms and if there is a release have built in features to mitigate impact outside the lab.

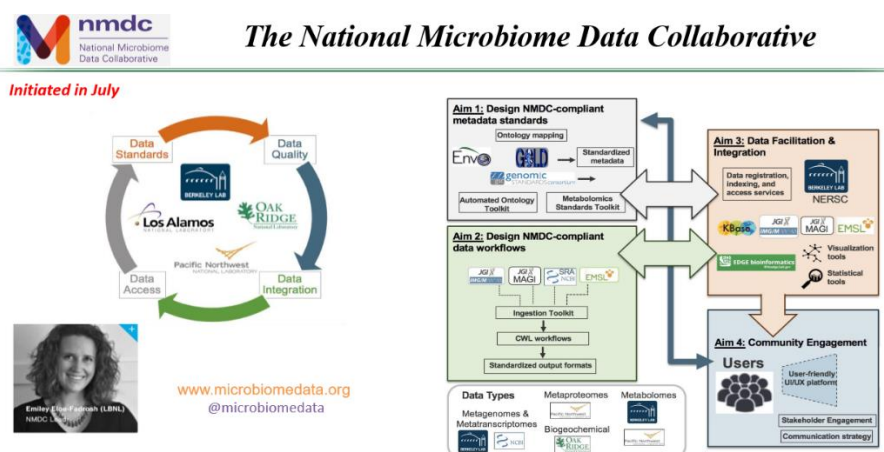
#### Sources and Additional Information:

- More detailed information on Systems Biology Research to Advance Sustainable Bioenergy Crop Development is available at [https://science.osti.gov/-/media/grants/pdf/foas/2015/SC\\_FOA\\_0001207.pdf](https://science.osti.gov/-/media/grants/pdf/foas/2015/SC_FOA_0001207.pdf).

#### Future Research Priorities

BER highlighted several ongoing and future research priorities based on congressional direction and three BER-sponsored workshop reports, including:

- **Microbiome database:** In July 2019, BER launched the National Microbiome Data Collaborative led by Lawrence Berkeley National Lab. Consistent with congressional direction, the purpose is to develop and maintain a catalog of candidate genes involved in plant-microbe relationships. The database would be designed to provide a valuable resource for researchers studying plant-microbe interactions to identify novel and potentially interesting genes and gain a better functional understanding of the plant microbiome that can be exploited for enhancing crop production. The graphic below shows the vision for this new data collaborative.



Source: DOE Office of Science.

- **Quantum information science:** BER will hold a quantum information science workshop on March 12-13, 2020 to help define BER's research priorities and solicit input from the biological and environmental research science community.
- **Breaking the bottleneck of genomes:** In September 2019, BER released its workshop report from November 2018, entitled, Breaking the Bottleneck of Genomes: Understanding Gene Function Across Taxa." The focus of the workshop was on creative solutions to overcome the bottleneck in developing new, innovative, and transformative experimental tools, datasets, and computational techniques that can define gene function on a massive and high-throughput scale similar to the pace of DNA sequencing. The report identifies the challenges, knowledge gaps, and opportunities for accelerated gene function discovery especially for microorganisms and plants of most relevant for DOE's mission in energy and the environment. DOE will use the research and technology priorities and recommendations of this workshop report to define

future funding opportunities and respond to the Administration's research priorities in the bioeconomy and engineering biology.

- Genome engineering for material synthesis workshop: In June 2019, BER released its workshop report from October 9-11, 2018, entitled "Genome Engineering for Materials Synthesis Workshop." The workshop explored the possibilities of using genome engineering techniques to design materials. The workshop report lays out the basic science opportunities for genetically encoded materials and the potential applications. The goal is to broaden the synthetic biology toolkit and explore the use of genomics in manipulating and producing inorganic and inorganic/organic hybrid materials. Similar to the prior report, DOE will use the research and technology priorities and recommendations of this workshop report to define future funding opportunities and respond to the Administration's research priorities in the bioeconomy and synthetic biology.

#### *Sources and Additional Information:*

- The full report "Breaking the Bottleneck of Genomes: Understanding Gene Function Across Taxa" is available at [https://science.osti.gov/-/media/ber/pdf/workshop-reports/2019/Breaking\\_the\\_Bottleneck\\_2019.pdf?la=en&hash=6D747F6C7037A0BFABDF9E0A100D963536868F01](https://science.osti.gov/-/media/ber/pdf/workshop-reports/2019/Breaking_the_Bottleneck_2019.pdf?la=en&hash=6D747F6C7037A0BFABDF9E0A100D963536868F01).
- The full report "Genome Engineering for Materials Synthesis Workshop" is available at [https://science.osti.gov/-/media/ber/pdf/community-resources/2019/GEMS\\_Report\\_2019.PDF?la=en&hash=0D7092AD5416A28207F0F95F94E00921D308A113](https://science.osti.gov/-/media/ber/pdf/community-resources/2019/GEMS_Report_2019.PDF?la=en&hash=0D7092AD5416A28207F0F95F94E00921D308A113).

#### Climate and Environmental Sciences

A main focus over the next several years, and in response to the new Administration's priority on earth system predictability, will be improved modeling to more accurately predict regional variability. As an example, current models failed to predict this year's unseasonably warm temperatures in the Arctic followed by devastating wildfires. A major goal will be improved predictive modeling ranging from subseasonal to multi-year—right at the nexus between weather and climate modeling and prediction.

BER's research priorities are consistent from last year. There is a continued focus on **Terrestrial-Aquatic Interfaces** (TAI), which are considered key to understanding earth system models and DOE continues to expand partnerships with the National Oceanic and Atmospheric Administration (NOAA), the National Science Foundation (NSF) and the National Aeronautics and Space Administration (NASA). **Water**, and specifically hydrology, are also a continuing priority. Starting in FY 2021, there will be more of a focus on **coastal issues** and in particular issues related to resiliency, especially with sea level rise, modeling interdependencies between water and energy, understanding the impacts of those interdependencies to energy and water infrastructure and predicting potential thresholds for failure. BER's focus will be on modeling the impact of sea level rise in watersheds and deltas and better understanding of coastal atmospheric science related to land and sea breezes.

#### *Funding Opportunities*

BER plans to release three FY 2020 funding opportunity announcements as early as November 2019, with funding awards made by July 1, 2020, subject to congressional appropriations and the availability of funds.

- Environmental System Science: This funding solicitation will seek proposals that improve quantitative and predictive understanding of critical terrestrial ecosystems processes and

feedbacks within high latitude (i.e., Arctic and Boreal) and coastal ecosystems. A main area of interest is the TAI. Specifically, the goal is for new or improved understanding of critical biogeochemical processes at the TAI, which have the potential for direct feedbacks to the Earth system (e.g., soil carbon transformation and methane biogeochemistry). At least \$5 million should be available to fund around 10 awards ranging from \$1 million to \$300,000 a year over two to three years.

- **Atmospheric System Research:** This funding solicitation will seek proposals that use observations, including DOE's Atmospheric Radiation Measurement user facilities, to advance fundamental understanding of the cloud, aerosol, precipitation, and radiation processes across a range of scales to improve the predictability of the Earth's radiative balance and hydrologic cycle. Similar to last year's solicitation, research topics are likely to include aerosol, warm boundary-layer atmospheric, convective cloud, and Southern Ocean cloud and aerosol processes. Approximately \$10 million should be available to fund between 15 and 24 awards ranging from \$150,000 to \$750,000 over two to three years. In FY 2019, BER received 95 proposals and 27 or 29 percent were funded.
- **Earth system modeling:** This funding call supports the development, coupling and testing of global climate model systems. The focus is on developing and applying a computationally advanced climate and Earth system model to investigate the challenges posed by the interactions of climate change with energy and related sectors. This includes atmospheric dynamics, clouds and chemistry; ocean dynamics and biogeochemistry; sea-ice and dynamic land-ice systems; land hydrology and biogeochemistry; and representations of human activities that have important interactions with climate. At least \$6 million should be available to fund around 10 awards for \$200,000 a year over three years.

#### *Sources and Additional Information:*

- The FY17 funding opportunity announcement for the Environmental System Science program is available at <https://www.grants.gov/custom/viewOppDetails.jsp?oppld=298742>.
- Last year's funding solicitation for Atmospheric Systems Research is available at <https://govtribe.com/opportunity/federal-grant-opportunity/atmospheric-system-research-asr-defoa0002034>.

#### *Research Priorities*

Consistent with the five-year strategic plan spanning 2018-2023, the main research priorities are:

1. **Integrated Water Cycle:** The focus is on studying relevant processes involving the atmospheric, terrestrial, oceanic, and human system components and their interactions and feedbacks across local, regional and global scales, with the goal of improving the predictability of the water cycle and reducing associated uncertainties in response to short- and long-term perturbations.
2. **Biogeochemistry:** The focus is on developing a robust predictive understanding of coupled biogeochemical processes and cycles across spatial and temporal scales by investigating natural and anthropogenic interactions and feedbacks—and associated uncertainties—within Earth and environmental systems.
3. **High Latitude:** The focus is on understanding and quantifying the drivers, interactions, and feedbacks both among the high-latitude components and between the high latitudes and the global system to reduce uncertainties and improve predictive understanding of high latitude systems and their global impacts.

4. **Drivers and Responses in the Earth System:** The focus is on advancing next-generation understanding of the drivers of the Earth system and their effects on the integrated Earth-energy-human system.
5. **Data-Model Integration:** The focus is on developing a broad range of interconnected infrastructure capabilities and tools that support the integration and management of models, experiments, and data across a hierarchy of scales and complexity to address the other four scientific grand challenges.

Recent and planned workshops run by the Climate and Environmental Sciences Division to inform future priorities include:

- Leveraging Distributed Research to Understand Watershed Systems workshop in January 2019 with report released in October 2019;
- Modes of Variability workshop in partnerships with NOAA, NSF, and NASA— April 2019;
- Climate Modeling Summit – April 2019;
- Cyberinfrastructure – April 2019;
- Precipitation Metrics workshop – July 2019 (the workshop report brief should be available in the next few weeks); and
- Integrated Hydro-Terrestrial Models- Development of A National Prediction Capability in partnership with NOAA, NSF, and USGS – September 2019.

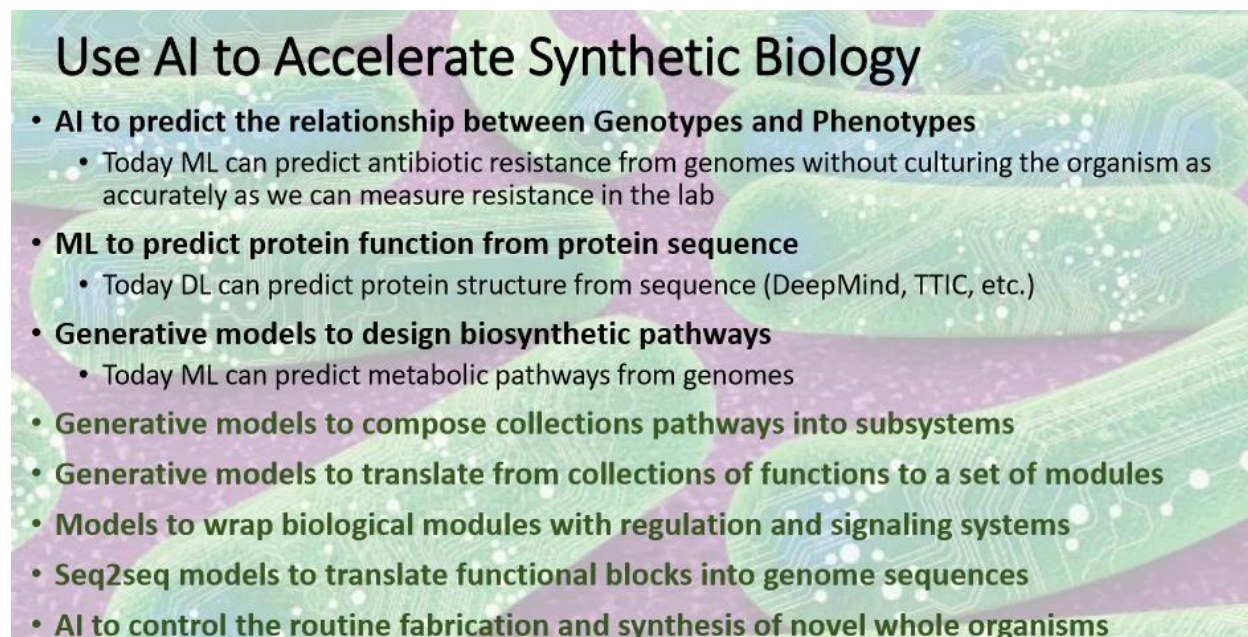
*Sources and Additional Information:*

- The Leveraging Distributed Research to Understand Watershed Systems report is available at [https://science.osti.gov/-/media/ber/pdf/community-resources/2019/Open\\_Watersheds\\_By\\_Design.pdf?la=en&hash=54460F28AE8A3C6CE7761AD4076AF8EDE0282ECC](https://science.osti.gov/-/media/ber/pdf/community-resources/2019/Open_Watersheds_By_Design.pdf?la=en&hash=54460F28AE8A3C6CE7761AD4076AF8EDE0282ECC).
- The Climate and Environmental Sciences Division Strategic Plan for 2018-2023 is available at [https://science.osti.gov/~media/ber/pdf/workshop%20reports/2018\\_CESD\\_Strategic\\_Plan.pdf](https://science.osti.gov/~media/ber/pdf/workshop%20reports/2018_CESD_Strategic_Plan.pdf).
- The June 2017 workshop report on “Research Priorities to Incorporate Terrestrial-Aquatic Interfaces in Earth System Models” is available at <https://tes.science.energy.gov/workshops/earthsysmodels.shtml>.

Artificial Intelligence

A main focus of discussion at the recent BERAC meeting was how to leverage artificial intelligence and scientific machine learning coupled with high performance computing and large data sets to accelerate the pace of innovation for biological sciences, including engineering biology, and improving the accuracy of earth system models. BERAC members were supportive of using AI as a new capability and tool, but also raised two major concerns that warranted additional discussion and study—workforce training and trustworthy AI. Regarding the workforce, the main concern was how to prepare students for the era of AI, including a robust curriculum that provided basic learning in computer science and mathematics to help advance science in multi-disciplinary efforts, and how to retain the best professors and faculty to teach the next generation with the private sector actively recruiting the best AI talent at research universities. Regarding trustworthiness, BERAC members wanted to make sure that the scientific community had a well-founded understanding of what assumptions, data, and cognitive process an AI system was using to provide answers to the scientific community. This touches on the issues of robustness, explainability, and reproducibility. Using AI-generated data for science requires a much higher level of trust and confidence than other applications.

One of the main examples presented to BERAC on the future of AI was to accelerate the application of synthetic biology. The slide below is a summary from the AI for Science townhall organized by DOE on October 22-23.



## Use AI to Accelerate Synthetic Biology

- **AI to predict the relationship between Genotypes and Phenotypes**
  - Today ML can predict antibiotic resistance from genomes without culturing the organism as accurately as we can measure resistance in the lab
- **ML to predict protein function from protein sequence**
  - Today DL can predict protein structure from sequence (DeepMind, TTIC, etc.)
- **Generative models to design biosynthetic pathways**
  - Today ML can predict metabolic pathways from genomes
- **Generative models to compose collections pathways into subsystems**
- **Generative models to translate from collections of functions to a set of modules**
- **Models to wrap biological modules with regulation and signaling systems**
- **Seq2seq models to translate functional blocks into genome sequences**
- **AI to control the routine fabrication and synthesis of novel whole organisms**

Source: DOE Office of Science.

### Early Career and Graduate Student Research Opportunities

DOE's **Early Career Research Program** support all six programs in the Office of Science, including biological, climate, and environmental science. This is an annual solicitation usually released by January. In 2019, DOE made 63 awards with 46 from research universities. To be eligible for an award, a researcher must be an untenured, tenure-track assistant or associate professor at a U.S. academic institution. University-based researchers typically receive about \$150,000 per year to cover summer salary and research expenses over 5 years. In the FY 2019 funding call, the topic area for biological sciences was systems-level design and engineering of microbial or plant systems for the production of biofuels and bioproducts and for climate and environmental sciences the topic area was environmental system science especially to support subsurface biogeochemical research and terrestrial ecosystem science.

DOE's **Office of Science Graduate Student Research Program** is also open to all of Office of Science programs but includes biology, earth and environmental sciences topic areas. The program provides a \$3,000 monthly stipend to support graduate students' theses at a DOE lab.

The second round of FY 2019 applications due November 14, 2019. The four biology topics include:

- computational biology and bioinformatics;
- biomolecular characterization and imaging science;
- plant science for sustainably bioenergy; and
- soil microbiology.

The three climate and environmental science topics include:

- environmental systems science;
- atmospheric system research; and

- earth system modeling.

*Sources and Additional Information:*

- The last funding call for Early Career and Graduate Student Research Opportunities program is available at <https://www.grants.gov/web/grants/view-opportunity.html?oppld=311818>.
- More information on the Office of Science Graduate Student Research Program is available at <https://science.osti.gov/wdts/scgsr>.

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## **Agency Updates**

### **NIH Releases Draft NIH Policy for Data Management and Sharing; Requests Public Comments**

The National Institutes of Health (NIH) this week released a Draft NIH Policy for Data Management and Sharing which outlines the proposed changes to how investigators will be expected to manage, maintain, and share data generated from NIH-funded research activities. NIH is requesting comments on the Draft Policy by **January 10, 2020**.

The Draft Policy would require individuals and entities submitting research proposals, including all extramural, intramural, contract, and other application types, to provide a *Data Management and Sharing Plan* that details how scientific data will be managed, preserved, and shared. The Plan may be submitted "Just-In-Time," or once the applicant is in the final rounds of review, in order to reduce administrative burden on investigators. For extramural research awards, submitted Plans would be assessed by NIH programmatic staff within the NIH institute or Center funding the research.

The Draft Policy also includes supplemental draft guidance on the elements of an effective Data Management and Sharing Plan. Under this guidance, each Plan should include:

- A description of the data type and estimated amount to be collected. This may include descriptions of the metadata scope, documentation, processing steps, or study protocols and the rationale of why these data types were chosen;
- An indication of any specialized tools, software, or code that may be necessary to access and manipulate the data;
- An indication of any standards that will be used on the data, including formats, identifiers, or other documentation;
- Information regarding where the data will be made available and when complete information can be expected to be available;
- An outline of any data sharing licenses, agreements, or use limitations that may apply. This would include a description of how the investigator will protect the privacy of human participants, if applicable; and
- The names of individuals who will be responsible for the oversight and management of the data.

Supplemental draft guidance outlining allowable costs associated with data management was also provided. The guidance states that any costs associated with the curation, storage, and/or upkeep of the data may be included in NIH budget requests.

NIH would review compliance with the *Data Management and Sharing Plan* annually as a part of the Research Performance Progress Reports. Failure to comply with the Plan as approved may result in special terms and conditions or termination of the award and may impact future funding decisions.

In a blog post, Office of Science Policy Director Carrie Wolinetz emphasized that the Draft Policy is not in its final form and strongly encouraged members of the research community to submit their comments on the Draft Policy by **January 10, 2020**.

#### *Sources and Additional Information:*

- The Draft Policy for Data Management and Sharing can be found at [https://osp.od.nih.gov/wp-content/uploads/Draft\\_NIH\\_Policy\\_Data\\_Management\\_and\\_Sharing.pdf](https://osp.od.nih.gov/wp-content/uploads/Draft_NIH_Policy_Data_Management_and_Sharing.pdf).
- The NIH notice of the Draft Policy and comment portal can be found at <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-20-013.html>.

- The Office of Science Policy blog post can be found at <https://osp.od.nih.gov/2019/11/06/draft-data-management-and-sharing-policy-we-need-to-hear-from-you/>.
- The portal to submit comments about the Draft Policy is available at <https://osp.od.nih.gov/draft-data-sharing-and-management/>.

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### **DOE Releases Request for Information to Share Future Opportunities in Lighting Technologies**

The Department of Energy (DOE) issued a Request for Information (RFI) to seek input from national laboratories, research universities, and private industry on future research and development priorities for lighting technologies. **Comments are due December 19, 2019.**

DOE supports research and development (R&D) of advanced lighting solutions through the Lighting R&D program of the Building Technologies Office within the Office of Energy Efficiency and Renewable Energy. DOE currently competes \$10 million to \$20 million each year in R&D awards to support solid-state lighting technologies. For example, DOE is expected to announce in the next month fiscal year (FY) 2019 awards to support five to 10 projects ranging from \$1.5 million to \$6 million over three years in highly efficient lighting technologies and systems to improve lighting energy efficiency, such as quantum dot optical down-converters and stable and efficient white organic light emitting diodes. In FY 2018, DOE made 11 awards, of which eight or 73 percent went to research universities.

The purpose of the RFI is for interested stakeholders to provide recommendations on lighting R&D research directions and future investment opportunities. In particular, DOE is interested in research gaps not addressed in DOE's 2018 Solid-State Lighting R&D Opportunities (RDO) report and opportunities where immediate applications are beyond general illumination and also help save energy in the built environment. In addition to the RDO report, interested researchers and students will have an opportunity to learn about DOE's current research portfolio and meet with DOE program managers at the 2020 DOE Lighting R&D Workshop in San Diego on January 28-30, 2020.

#### *Sources and Additional Information:*

- The Request for Information is available at <https://eere-exchange.energy.gov/#Foald4a24a80b-5b8f-435c-9c3d-322157fad550>.
- The DOE 2018 Solid-State Lighting R&D Opportunities report is available at <https://www.energy.gov/eere/ssl/downloads/2018-solid-state-lighting-rd-opportunities>.
- Information on the 2020 DOE Lighting R&D workshop is available at <https://www.energy.gov/eere/ssl/2020-lighting-rd-workshop>.

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### **Upcoming DOE Internship, Fellowship, and other STEM Opportunities**

Please find below upcoming Department of Energy (DOE) science, technology, engineering, and math (STEM) opportunities, including internships, fellowships, and competitions, for undergraduate and graduate students as well as faculty. The list of opportunities below is not exhaustive but represents major DOE opportunities in FY 2020. The opportunities are listed in order of application due dates.

architecture, engineering, computer science, and other STEM disciplines to enter the online student design competitions for solutions to

building design research and development topics as individuals or as members of a team. Selected interns will be appointed full-time for the summer term (10 weeks) at Oak Ridge or NREL and will be engaged in a research and technology project under the guidance of a laboratory scientist or engineer. A minimum of 10 weeks is required. Undergraduates will receive a stipend of \$600 per week and graduate level students will receive a stipend of \$700 per week if current master's level or \$750 per week if current PhD level students. There is a \$175 per week housing allowance for participants whose permanent address is 50 miles or more from the site location city and eligible mileage or flight travel to/from the appointment city will be reimbursed up to \$500.00. Applications are due November 15, 2019.

**Undergraduate Scholarship Competition:** This is a scholarship opportunity requiring undergraduate students to develop a chart or infographic that would communicate the benefits of autonomous and connected vehicles to improve the safety and efficiency of the transportation system to the public. There are three prizes: a \$5,000, \$3,000, and \$1,000 scholarship for first, second, and third place, respectively. The deadline is December 6, 2019 and winners would be announced by the end of December.

**Collegiate Wind Competition:** This competition is open to interdisciplinary teams of undergraduate students. The competition involves designing, building, and testing a wind turbine in a wind tunnel as well as designing a hypothetical utility wind farm that maximizes energy production and balances environmental and community impacts. Proposals for student teams for the 2021 competition are due on December 9, 2019.

**Marine and Hydrokinetic Graduate Student Research Program:** This program is designed for graduate students to help them advance research in U.S. hydropower and marine and hydrokinetic generation at both their academic institutions and at an external hosting facility. Graduate students must spend a minimum of six months at the host facility. The main benefits are advancing doctoral thesis and enhancing education and training in water power technologies. The deadline to apply is December 31, 2019.

**DOE Scholars Program:** This program is designed for undergraduate, graduate, and recent graduate students who are interested in pursuing a federal career with DOE and gain a competitive advantage as they apply to entry and mid-level research, technical and professional positions at DOE and organizations that support the DOE mission. DOE provides a stipend for living expenses and travel reimbursement. The deadline to apply is January 3, 2020.

**The Science Undergraduate Laboratory Internships Program:**

This program is open to undergraduate students and recent graduates interested in pursuing STEM careers by providing research experiences at DOE laboratories. Selected students participate as interns appointed at one of 17 participating DOE laboratories/facilities. They perform research, under the guidance of laboratory staff scientists or engineers, on projects supporting the DOE mission. Applications for the SULI program are solicited annually for three separate internship terms. Internship appointments are 10 weeks in duration for the Summer Term (May through August) or 16 weeks in duration for the Fall (August through December) and Spring (January through May) Terms. Applications are due January 9, 2020.

**Visiting Faculty Program:**

This program seeks to increase the research competitiveness of faculty members and their students at institutions historically underrepresented in the research community. As part of the program, selected university faculty members collaborate with DOE laboratory research staff

on a research project of mutual interest. Faculty member participants may invite up to two students (one of which may be a graduate student) to participate in the research project. Applications for the program are solicited annually for appointments to the Summer Term (May through August), which is 10 weeks in duration. Each of the 15 participating DOE laboratories offer different research opportunities. Applications are due January 9, 2020.

**The Mickey Leland Energy Fellowship Program:** This program provides undergraduate, graduate, and PhD students with educational opportunities to gain real-world, hand-on research experience in fossil energy issues. The primary target is under-represented and minority students in STEM fields to expose them to energy issues and DOE missions. Applications are due January 12, 2020.

<https://www.zintellect.com/Opportunity/Details/DOE-ORNL-NREL-BTIP>.

*Sources and Additional Information:*

- More information on the Building Technologies Internship Program at Oak Ridge and the National Renewable Energy (NREL) Labs is available at
- More information on the Undergraduate Scholarship Competition is available at <https://www.fbo.gov/index?s=opportunity&mode=form&id=8be1f03f4a458853825d738aa3464e6c&tab=core&cyview=1>
- More information on the College Wind Competition is available at
- More information on the Marine and Hydrokinetic Graduate Student Research Program is available at
- <https://orise.ornl.gov/mhk-research-program/index.html>.
- More information on the DOE Scholars Program is available at <https://orise.ornl.gov/doescholars/default.html>.
- More information on the Science Undergraduate Laboratory Internships Program is available at <https://science.osti.gov/wdts/suli>.
- More information on the Visiting Faculty Program is available at <https://science.osti.gov/wdts/vfp>.
- More information on the Mickey Leland Energy Fellowship Program is available at <https://orise.ornl.gov/mlefp/>

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## Department of Energy ASCR Holds AI for Science Townhall Meetings

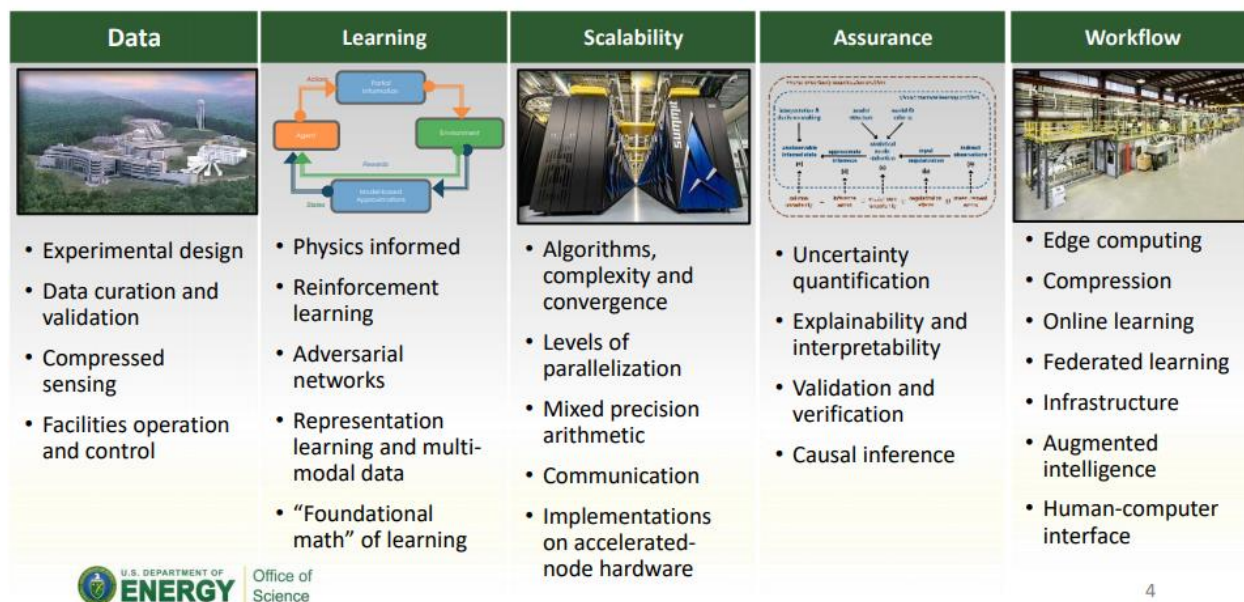
On October 22 and 23, the Department of Energy (DOE) Office of Advanced Scientific Computing Research (ASCR) held the fourth and last of a series of townhall meetings to help identify future research directions at the intersection of artificial intelligence (AI) and DOE's scientific priorities. In total, nearly 1,500 scientists from national laboratories, research universities, and industry participated in all four events. A final report that summarizes the priority research directions and applications of AI to address DOE missions should be completed by the end of the year and will serve as a framework for future investments in DOE's AI initiative starting in fiscal year (FY) 2021. The summary below provides advance intelligence on priority areas and highlights upcoming FY 2020 funding opportunities in AI.

### AI Townhalls and Future Applications

ASCR led these townhalls, and the planning activities that will follow them, as the decade long Exascale Computing Initiative comes to a close and because the Administration and DOE have identified AI as a major research and development priority. In particular, ASCR views this inflection point as an

opportunity to develop a vision for driving advances in AI across the Office of Science that leverages the capabilities of its new exascale systems in concert with a more robust and future-focused research agenda in applied mathematics, computational science, and computer science. The graphic below shows how AI can address DOE's research needs.

## DOE research challenges touch all areas of AI



Source: DOE Office of Science.

Ultimately, the findings of these townhalls will be used to map out a strategic vision for leveraging the integration of modeling and simulation, data science, and machine learning toward achieving the following over a 10-year horizon:

- Learned models begin to replace data;
- Experimental discovery processes are dramatically refactored;
- Many questions are pursued semi-autonomously at-scale;
- Simulation and AI approaches merge;
- Theory becomes data for next-generation AI; and
- AI becomes a common part of scientific laboratory activities.

Office of Science Director Chris Fall opened the DC-based townhall by outlining in broad terms DOE's interest in AI and the agency's rationale for placing itself at the center of a government-wide approach to driving the technology forward. Dr. Fall made the case that as the steward of the National Laboratory complex and the owner of the nation's most powerful supercomputers, DOE is uniquely positioned to work with other federal agencies as well as external partners to develop AI-enabled applications for significant challenge areas both within and outside of its mission space. He also spoke to the establishment of DOE's new Artificial Intelligence and Technology Office (AITO), which will support cross-cutting research activities in AI, foster external partnerships, integrate AI capabilities into the agency's overall operations, and develop ethical and legal policies for the agency's adoption of AI.

Interagency collaboration and coordination were a major focus of the discussion during the townhall, reflecting DOE's view that they are essential to its overall vision for AI. As an example, DOE and the

National Cancer Institute (NCI) have established the Joint Design of Advanced Computing Solutions for Cancer (JDACS4C) activity, which aims to advance AI-enabled precision oncology by marrying DOE's computing capabilities and algorithm development with NCI's biomedical research expertise. JDACS4C is currently limited to three pilot projects with national laboratories, but ASCR is exploring the potential for collaboration with non-federal partners.

All four townhalls featured breakout sessions on AI for specific scientific domains as well as crosscutting areas, though the DC townhall included a session summarizing the findings of the domain-specific breakouts held during the previous three events. AI applications of most interest to DOE include materials, chemistry, nanoscience, Earth systems, biology and life sciences, fundamental physics, engineering manufacturing, smart energy infrastructure, computer science, and fusion. Some of the crosscutting issues being addressed are data life cycle and infrastructure, hardware architectures, AI for experimental facilities, and AI at the edge. In addition, the townhall organizers closed the event by detailing how AI would impact six specific application areas relevant to DOE's mission:

- **Biology** – DOE is interested in leveraging AI to accelerate advances in synthetic biology, including through the use of machine learning algorithms to absorb, understand, and manipulate biological processes.
- **User Facilities** – AI can be used to optimize operations at large scientific user facilities, such as beam lines, and for on-site processing of the data being generated through “AI-at-the-edge” capabilities.
- **Materials** – DOE is interested in developing machine learning algorithms capable of continually learning from autonomously run experiments and then updating their predictions based on a constant stream of new data. These capabilities may be particularly relevant to the synthesis of quantum materials.
- **Cosmology** – DOE seeks to use AI to simulate the development of the universe from its formation to the present, and then predict future expansions at all scales. Data generated by current and future dark energy and dark matter experiments will be critical to advances in this application area.
- **Manufacturing** – AI could be used to optimize supply chains and the synthesis and use of specialty materials, enabling more efficient manufacturing processes.
- **Cities** – AI can help optimize mobility, safety, energy consumption, and security in cities through the integration of edge computing and sensors.

#### FY 2020 AI Funding Opportunities

DOE started making targeted investments in AI in FY 2019, which included funding calls in Data Science for Discovery in Chemical and Materials Sciences, a co-design center for AI hardware and software for cybersecurity and electric grid resilience, and the Advanced Research Project Agency-Energy's support of AI tools to transform operations and maintenance of advanced nuclear reactors.

DOE plans to build on the abovementioned investments by allocating approximately \$123 million to AI and scientific machine learning in FY 2020, including \$71 million in the Office of Science, \$42 million in the Advanced Scientific Computing program in the National Nuclear Security Administration, and \$10 million in the applied energy offices. While a final list of funding opportunities is subject to Congress completing FY 2020 appropriations, DOE plans to release the following funding solicitations focused on AI:

- \$10 million for applied mathematics in fundamental scientific machine learning principles identified in the Basic Research Needs report “Scientific Machine Learning: Core Technologies for Artificial Intelligence”;
- \$5 million-\$10 million for one or two more AI Co-design centers to develop core hardware and software technologies for DOE mission applications;
- \$10 million for computational tool development for integrative systems biology data analysis (data integration, analysis and sharing for genomics and synthetic biology);
- \$5 million-\$10 million for Earth system modeling (computationally advanced climate and Earth system model to investigate the challenges posed by the interactions of climate change with energy and related sectors);
- \$7 million for machine learning for fusion energy sciences and plasma physics; and
- \$13 million for computational materials science centers with an emphasis on data analytics and machine learning for data driven science.

*Sources and Additional Information:*

- Additional information about the townhall, including copies of the presentations delivered, can be found at [https://orau.gov/ai\\_townhall/agenda.htm](https://orau.gov/ai_townhall/agenda.htm).
- The Basic Needs Research report is available at <https://www.osti.gov/biblio/1478744>.

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### **BARDA Hosts Annual Industry Day; Announces Opportunities to Engage**

On October 15 and 16, Lewis-Burke attended the Biomedical Advanced Research and Development Authority (BARDA) Industry Day, in Washington, D.C. The annual event is an opportunity to listen to BARDA leadership and program managers on recent successes and future priorities, as well as network with agency and industry partners. For those seeking funding and BARDA feedback on products and ideas, the agency integrated opportunities for industry and academia to present in their signature “Lightning Talk” and “TechWatch” platforms. In addition, program managers encouraged stakeholders to consider the following opportunities:

#### **BARDA Ventures RFI**

During Industry Day, BARDA encouraged stakeholders to respond to its recently released Request for Information (RFI) on a new funding mechanism: BARDA Ventures. “BARDA Ventures, through a third-party non-profit, will provide dilutive investment into promising health security products and technologies to enhance national health security preparedness and response. The [Medical Countermeasure Innovation Partnership (MCIP)] initiative is a key priority of [the Assistant Secretary for Preparedness and Response (ASPR)] and BARDA, helping to ensure that we fulfil our mission to save lives and protect Americans from 21st century health security threats. BARDA Division of Research Innovation and Ventures (DRIVE) seeks to partner with a third party entity (Ventures Partner) that will address gaps in preparedness and areas within the continuum of response which require innovative and entrepreneurial approaches that would otherwise not be considered under traditional medical countermeasure (“MCM”).” The comments must be submitted electronically to [DRIVE.Contracting@hhs.gov](mailto:DRIVE.Contracting@hhs.gov), by **November 18, 2019, at 9:00 AM**.

#### **DRIVE EZ BAA**

Last year, BARDA launched DRIVE to foster technological innovation and transformative solutions to address public health security threats. DRIVE focuses on three areas: Early Notification to Act, Control, and Treat (ENACT); Sepsis; and other disruptive advances to treat, detect, and prevent public health

outbreaks. Unlike traditional BARDA funding mechanisms, the DRiVE EZ Broad Agency Announcement (BAA) encourages a range of proposals, including early concepts and pre-clinical research. Through the DRiVE EZ BAA, awards can be made in as few as 30 days and projects can be funded up to \$750,000. Through this mechanism BARDA seeks to increase engagement with nontraditional partners, including universities and small businesses.

### **TechWatch**

For those interested in feedback from program managers before applying, BARDA encourages outreach through TechWatch, an in-person or virtual meeting with BARDA scientific, technical, and contracting staff, as well as representatives from other interested federal agencies. By participating in TechWatch, proposers can better understand how to tailor their product or technology to meet BARDA's mission and address potential regulatory challenges, increasing the likelihood of success when submitting through a funding mechanism.

#### *Sources and Additional Information:*

- BARDA Ventures RFI is available at: <https://drive.hhs.gov/ventures.html>.
- Full BARDA Ventures RFI details are available at [https://www.fbo.gov/index?s=opportunity&mode=form&id=2131180aba6c9285de74656e2e8191c6&tab=core&\\_cview=0](https://www.fbo.gov/index?s=opportunity&mode=form&id=2131180aba6c9285de74656e2e8191c6&tab=core&_cview=0).
- The DRiVE EZ BAA is available at: <https://drive.hhs.gov/partner.html?id=applyNow>.
- Additional information on TechWatch is available at: [TechWhhttps://www.phe.gov/about/bar-da/Pages/BARDA-techwatch-Mtgs.aspx](https://www.phe.gov/about/bar-da/Pages/BARDA-techwatch-Mtgs.aspx).

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### **NSF Geosciences Directorate Major Environmental Research Programs Update**

The following contains advanced intelligence and analysis of major environmental research programs led by NSF's Geosciences Directorate (GEO). Lewis-Burke has been tracking several major developments as GEO accelerates the roll-out of its Coastlines and People (CoPe) program and the next competition of its Navigating the New Arctic (NNA) Big Idea. Similar to the popular (and now sunset) INFEWS program, both will serve as key mechanisms for a range of opportunities available to universities beginning in early FY 2020.

**Coastlines and People:** As previously reported by Lewis-Burke, NSF GEO anticipates the new CoPe program will support center-level research hubs that address regional and/or topical needs. Emphasis will be placed on integrative partnerships between the leaders of these forthcoming hubs. NSF is also interested in tangential connections to coastlines such as the impact on human displacement with changing coastlines; this means that even land-locked states are able to participate. A competition for the first round of hubs is expected in early spring 2020.

**Navigating the New Arctic:** NSF just released the anticipated FY 2020 solicitation for the second round of NNA awards. NNA is geared towards research at the intersection of Arctic natural, social, and built environments. Interested faculty are encouraged to reach out to NSF program managers with questions about a research topic's suitability.

**Study on Earth System Science:** NSF GEO leadership has advocated for a National Academies of Science study on Earth system science research needs. Such an effort would shape future Earth science research

priorities (and subsequent funding opportunities) beyond NSF. A greater emphasis on this research is consistent with OSTP Director Kelvin Droegemeier's inclusion of Earth System Predictability in the annual FY 2021 Administration Research and Development Budget Priorities.

Lewis-Burke will continue tracking these programs and will share additional updates as they become available.

*Sources and Additional Information:*

- Information on the Coastlines and People program is available at <https://coastlinesandpeople.org/>.
- The FY 2020 NNA solicitation is available at <https://www.nsf.gov/pubs/2020/nsf20514/nsf20514.htm>.

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